

Spring 2017 in Review

With June 1 comes the end of meteorological spring, a period defined as covering the months of March through May. The spring of 2017 saw both March and May with average temperatures generally within a degree or two either side of normal. April on the other hand was much warmer than normal, with much of central Indiana experiencing temperatures 5 to 8 degrees above normal. Indianapolis experienced their 3rd warmest April on record, warming above 70° on 17 days in April, the most 70°+ days in April since 2010. The warmer than normal temperatures in April were largely responsible for the spring season finishing at 2 to 4° above average.

This was one of the wettest springs on record for much of central Indiana as active and rainy weather impacted the Ohio Valley throughout the three months. The rainiest stretch came from late April through much of May as storms routinely impacted central Indiana. The 18.83" of precipitation that occurred at Indianapolis produced the wettest spring since 1996 and the fifth wettest spring on record.

The following is a review of weather conditions experienced in central Indiana during the 2017 spring season.

Temperatures

MARCH

After the mild finish to February, temperatures feel back quickly in wake of the strong cold frontal passage early on the morning of the 1st. Highs slipped back into the 30s and 40s for the most part through the 4th. Another warmup though began on the 5th and continued through the 9th as predominant southerly flow enabled highs to rise largely into the 60s. The passage of another cold front on the 9th ushered in an extended period of the coldest weather of the entire month as the Ohio Valley remained largely under the influence of an upper trough. High temperatures from the 10th through the 15th largely were held under 40 degrees and some locations on the 13th and 14th were unable to even rise above freezing. Lows bottomed out in the teens through much of the area from the 14th through the 16th.

Temperatures modified slowly beginning on the 16th but didn't fully recover to near normal levels until the 19th and 20th as daytime highs finally rose above 50 degrees. Chillier weather briefly returned on the 22nd in the wake of a frontal passage before much warmer weather expanded into the region for most of the rest of the month. Highs

surged into the 70s on the 24th and 25th, ushering in a rapid surge in vegetation growth and greenup across central Indiana. Temperatures remained above normal for the following several days, and southern portions of central Indiana were able to warm into the upper 70s to near 80 degrees on the afternoon of the 30th as a warm front moved north through the area. The passage of a cold front later that evening ushered in cooler weather for the final day of March, with temperatures falling through the 40s on a cloudy, raw and damp day.

Average temperatures finished up generally 1 to 3 degrees above normal across central Indiana for March. If it hadn't been for the surge of warmer temperatures at the end of the month, the March average temperature at Indianapolis would have ended up being colder than the February average temperature, something that had not occurred since 1984. As it ended up, average temperatures for the month were half a degree to around 2 degrees warmer than February across the region.

APRIL

April began cooler than normal through the first week or so, highlighted by highs unable to get out of the 40s for many areas on the 6th in the wake of a strong cold frontal passage. Lows were commonly in the 30s and 40s with most locations across central Indiana experiencing their coldest morning of the month on the 8th near or just below the freezing mark.

Temperatures began a steady recovery on the 9th and remained above normal for most of the following two weeks as most days saw highs in the 70s and 80s. A brief cooldown on the 21st and 22nd in the wake of another strong cold front was followed by yet another extended period of above normal warmth that lasted largely through the end of the month. The warmest day of April came for most locations on the afternoon of the 26th as highs surged into the middle 80s. The placement of a warm front across the region during the last few days of April led to stark difference in temperatures from north to south across central Indiana. On the 28th and 29th for example, highs struggled to rise out of the 50s over northern portions of central Indiana while temperatures rose to near 80 over far southern portions of the area.

Average temperatures for the month ranged from 55° to 60° across central Indiana, producing one of the warmer Aprils on record for many. At Indianapolis, the monthly average temperatures of 59.3°F made it the 3rd warmest April on record, surpassed only by April 1896 and April 2010. Highs exceeded 80° on 4 days in April but more impressively, highs were at or above 70° on 17 days throughout the month, the most 70°+ days in April in 7 years and only the 3rd April since 2000 with at least that many 70°+ days.

MAY

Cool and wet weather to finish April continued into the first several days of May with most locations remaining below 70° for highs until the 9th. The coolest temperatures occurred on the 3rd and 4th as heavy rain and raw conditions impacted central Indiana. Several locations were unable to rise out of the 40s on the 4th, including Indianapolis with a high of 48°, the coolest daily high temperature recorded in May since May 6, 1989 when the high only made it to 47°.

After frosty mornings in the 30s for many from the 6th through the 8th, temperatures warmed briefly into the lower 80s by the 10th before slipping back into the 60s and lower 70s. Beginning on the 14th, an extended string of warm weather courtesy of high pressure and southerly flow saw daily high above 80°, peaking in the mid and upper 80s on the 18th. A frontal boundary setting up over central Indiana led to cooler temperatures over northern parts of the area on the 19th and 20th while southern portions of central Indiana remained in the 80s.

The passage of a cold front on the 21st followed by the impacts from an upper level low pressure brought cooler air south into the region. Highs in the 60s and lower 70s were common through the 25th before upper 70s and lower 80s returned for the region for Memorial Day weekend and the last few days of the month. Overall across central Indiana, temperatures for May averaged near normal, with all main sites except for Lafayette finishing the month within a degree of average.

Temperature Data for Sites in Central Indiana

Site	Spring 2017 Temperature	Normal Temperature	Diff. From Normal
Indianapolis Int'l Airport	55.1	52.6	+2.5
Lafayette	52.2	51.5	+0.7
Muncie	54.4	50.9	+3.5
Terre Haute (*)	55.8	53.0	+2.8
Bloomington	56.1	53.0	+3.1
Shelbyville	56.5	52.5	+4.0
Indianapolis – Eagle Creek	55.2	52.8	+2.4

(*) – Terre Haute high temperature data not available on March 17 and 18.

Spring Extremes Across Central Indiana

Site	Warmest Temperature	Coldest Temperature
Indianapolis Int'l Airport	85 on 5/18	17 on 3/15 and 3/16
Lafayette	87 on 5/18	14 on 3/14

Muncie	88 on 5/18	17 on 3/14
Terre Haute	87 on 5/18	17 on 3/16
Bloomington	86 on 5/16 and 5/18	14 on 3/16
Shelbyville	87 on 5/16 and 5/18	19 on 3/15
Indianapolis-Eagle Creek	86 on 5/18	18 on 3/15 and 3/16

Precipitation

MARCH

March monthly precipitation was near normal to above normal for all of Indiana except for southwest and south central Indiana. Monthly precipitation was below normal in these areas. Monthly totals ranged from slightly less than 2 inches in southwest Indiana to more than 5 inches in central and southeast Indiana. Much of the state received 3 to 5 inches during the month.

Heavy rains at the end of February and during the early hours of March brought lowland flooding to the Muscatatuck, East Fork White and White Rivers in southern Indiana. Rivers remained above flood stage from less than a day to 9 days in southwest Indiana. Brief flooding occurred on the 20th in east central Indiana following rains of nearly 2 inches. Rainfall at the end of March renewed high water along the Wabash River in western Indiana.

After little snow fell in February, March snowfall was normal to above normal for northern Indiana. Snowfall totals ranged from around 4 inches to more than 15 inches in northwest Indiana. Snowfall in the remainder of the state varied from a trace to near 3 inches. Snow during March occurred only from the 12th through the 17th.

APRIL

April monthly precipitation was above normal for nearly all of Indiana. A major rain event from late on the 28th through early May 1 provided many areas in central and southern Indiana with as much or more rainfall as received earlier in April.

Monthly totals through the 27th ranged from a half of inch in east central Indiana to slightly over 5 inches in west central Indiana. Additional rainfall of 2 to over 9 inches during the last 3 days of April pushed monthly totals to 2.5 inches in extreme northern Indiana to over 13 inches in extreme southwest Indiana. Totals in central Indiana ranged from 3 to over 9 inches. Much of the state received 4 to 8 inches for April. Rainfall at the end of April erased abnormally dry conditions that had persisted since the end of March in portions of southwest Indiana.

Early in April rainfall of up to 2 inches in northern Indiana from late on the 4th through the late morning of the 6th caused lowland flooding in portions of north central Indiana and along the Wabash River in western Indiana. Rainfall at the end of April caused widespread flooding to develop in central and southern Indiana by May 1st. This flooding is expected to be the highest for much of the area since late December 2015 and early January 2016.

MAY

The wet pattern of late April continued throughout May for most of Indiana. Monthly precipitation was above normal for all of Indiana except for the northwest and southwest portions of the state. Monthly totals ranged from slightly less 3 inches in northwest Indiana to over 10 inches in portions of south central and southeast Indiana. Totals in central Indiana varied from 5 to nearly 10 inches.

Heavy rains were a frequent occurrence during May. An inch or more of rain fell somewhere in Indiana at the very beginning of May, the 3rd through the 5th, the 9th through the 10th, the 19th through the 21st, the 24th through the 25th and the 27th through the 29th. The only dry spell for the state occurred from the 11th through the 17th.

Widespread river flooding that began at the end of April became significant flooding in western and much of southern Indiana following the rains from the 3rd through the 5th. The dry spell during the middle of the month allowed all flooding to end except for the Wabash River in the Riverton area. The return of rain on the 19th brought renewed flooding to the Wabash River. Rains during the remainder of the month prolonged the flooding along the Wabash River and will extend the high water into June. The Wabash River had remained near or above flood stage for the entire month of May.

One of the worst flash flood events in Indiana history occurred during the late afternoon and early evening of the 19th just south of central Indiana. Heavy to torrential rains began to fall in the Salem area shortly after 4pm EDT and ended by 8pm EDT. In less than 4 hours, rains of more than 6 inches fell. The West Fork of Blue River at Salem rose over 16.5 feet from 3:30 pm EDT to crest at 10:15 pm EDT. The rate of rise approached 9 feet per hour just before the United States Geological Service (USGS) equipment maxed out at 7:30 pm EDT. This catastrophic flash flood caused millions of dollars of damage and was among the worst to strike Indiana.

A much lesser flash flood happened in east central Indiana on the afternoon of the 24th. Rainfall of more than 2 inches fell in about a 4 hour period ending around 1 pm EDT in Henry County. Additional rain continued on and off through the early morning of the 25th. Flooding affected some Henry County homes and numerous local roads.

Spring Precipitation Data for Sites in Central Indiana

Site	Spring 2017 Precipitation	Normal Precipitation	Diff. From Normal
Indianapolis Int'l Airport	18.83	12.42	+6.41
Lafayette (*)	15.51	10.40	+5.11
Muncie (**)	13.85	11.03	+2.82
Terre Haute	18.58	14.15	+4.43
Bloomington	16.76	13.82	+2.94
Shelbyville	13.18	13.03	+0.15
Indianapolis – Eagle Creek	16.68	12.47	+4.21

(*) – Lafayette precipitation data not available on April 26 and 27.

(**) – Muncie precipitation data not available on May 25.

Severe Weather

Severe thunderstorms that developed over the Mississippi Valley ahead of a strong cold front on the evening of February 28, moved across parts of central Indiana early on the morning of March 1. Storms produced wind damage and hail, with several brief tornadoes reaching EF1 and EF2 intensity impacting parts of Daviess, Lawrence and Jackson Counties prior to daybreak on the 1st. Scattered strong thunderstorms affected primarily the northern Wabash Valley on the early morning of March 7th ahead of a cold front. Storms exhibited strong wind gusts around 50 mph. Thunderstorms producing large hail tracked from northwest to southeast across central Indiana during the afternoon of March 20th. The largest hail fell near Arlington in Rush County with golf ball size stones occurring. To finish out one of the busier Marchs in recent years, severe thunderstorms developed along a warm front moving north through the region on the afternoon of March 30th. A supercell produced hail up to golf ball size and multiple funnel clouds as it tracked northeast through Madison and Delaware Counties. A broken line of strong to severe storms along a cold front followed during the evening with additional wind damage occurring from the north side of Indianapolis northeast towards Pendleton, Fortville and Anderson.

April was a busy month for severe weather across central Indiana. Severe weather over the southern half of central Indiana ahead of a cold front on the afternoon of April 5th produced large hail, damaging winds and an EF1 tornado over Daviess County. Thunderstorms producing large hail impacted parts of central Indiana in two waves on April 10th, during the morning and again during the afternoon and evening. There were several occurrences of golf ball size hail across Tippecanoe County during the morning. Scattered severe storms again impacted parts of central Indiana with damaging winds and large hail during the late afternoon and evening of April 20th. An EF1 tornado

touched down near Millhousen in southern Decatur County during the evening. Severe thunderstorms impacted mainly the northwest half of central Indiana during the evening hours. Golf ball size hail occurred in both Kokomo and Lebanon, and a 73 mph gust was measured near Sharpsville in Tipton County. The presence of a warm front in the region brought several rounds of thunderstorms from April 28th through April 30th with severe weather occurring during the evenings of April 28th and 29th. An intense line of storms impacted areas from Bloomington east through Columbus and southern Decatur County on the evening of April 28th. The most extensive damage occurred from the east side of Columbus east into southern Decatur County with straight line winds estimated at 90 to 100 mph. Storms on April 29th produced large hail over the northern Wabash Valley.

Multiple severe weather events impacted central Indiana throughout May. Damaging winds accompanied thunderstorms on the evening of May 10th and early morning of May 11th from the Wabash Valley east through the southern portions of the Indianapolis metro area. Numerous trees were downed along with damage to structures and homes in Vigo County by winds estimated at up to 70 mph. A frontal boundary hanging across the region brought multiple periods of strong to severe thunderstorms from the evening of May 18th through the evening of May 20th. On the afternoon of May 19th, scattered storms produced large hail across the area, including 2 inch hail in Bloomington near the campus of Indiana University. A storm near Pendleton in Madison County produced damage at the Nestle plant, causing 2 injuries and severe damage to a semi-truck and two 53 foot-long trailers. Severe storms erupted again during the evening of May 20th in vicinity of the warm front over northern portions of central Indiana. A supercell tracked across Clinton and western Howard Counties, producing a small EF-1 tornado in the village of Forest that caused damage to a pole barn and a fire station. A second EF-1 tornado occurred just west of Thorntown in Boone County, causing damage to a barn. Severe weather again impacted central Indiana at times over the Memorial Day weekend as yet another frontal boundary set up over the region. Severe storms developed over northern and central Illinois on the afternoon of May 26th, tracking into western portions of central Indiana during the evening. A supercell produced large hail up to golf ball size through Warren and Fountain Counties before developing into a squall line with damaging winds up to 70 to 75 mph through Montgomery and northwest Hendricks Counties. Significant wind damage occurred in Crawfordsville with numerous large trees and business signs downed. Additional storms ahead of a cold front on the evening of May 28th brought pockets of wind damage to southern and eastern portions of the Indianapolis metro area. The most extensive damage occurred west of Fountaintown in Shelby County where a pole barn was flattened. Additional information on many of these storm events can be found at the event summaries web page, <http://www.weather.gov/ind/events>.

For information on severe weather in other areas during the spring season, visit the Storm Prediction Center "Severe Weather Event Summaries" website at <http://www.spc.noaa.gov/climo/online/>.

Indianapolis Data

INDIANAPOLIS MARCH 2017 SUMMARY

	Average Temperature	Total Precipitation	Total Snowfall	Highs at or above 70°/80°
March 2017	43.8	4.72	1.0	3/0
Normal March	42.2	3.56	2.6	3/0
Difference from Normal	+1.6	+1.16	-1.6	0/0

March 2017 All-Time Ranks:

Temperature: 40th Warmest

Precipitation: Tied for 36th Wettest

Snowfall: Tied for 42nd Least Snowiest

INDIANAPOLIS APRIL 2017 SUMMARY

	Average Temperature	Total Precipitation	Total Snowfall	Highs at or above 70°/80°
April 2017	59.3	5.60	0.0	17/4
Normal April	53.0	3.81	0.2	10/5
Difference from Normal	+6.3	+1.79	-0.2	+7/-1

April 2017 All-Time Ranks:

Temperature: 3rd Warmest

Precipitation: 24th Wettest

INDIANAPOLIS MAY 2017 SUMMARY

	Average Temperature	Total Precipitation	Total Snowfall	Highs at or above 70°/80°
May 2017	62.3	8.51	0.0	19/7
Normal May	62.7	5.05	Trace	20/8
Difference from Normal	-0.4	+3.46	0.0	-1/-1

May 2017 All-Time Ranks:

Temperature: Tied for 68th Coolest

Precipitation: 8th Wettest

INDIANAPOLIS SPRING 2017 SUMMARY

	Average Temperature	Total Precipitation	Total Snowfall	Highs at or above 70°/80°
Spring 2017	55.1	18.83	1.0	39/11
Normal Spring	52.6	12.42	2.8	33/13
Difference from Normal	+2.5	+6.41	-1.8	+6/-2

Spring 2017 All-Time Ranks

Temperature: Tied for 13th Warmest

Precipitation: 5th Wettest

Snowfall: Tied for 44th Least Snowiest

Summer 2017 Outlook for Central Indiana

The official outlook for the 2017 summer season (June-August) from the Climate Prediction Center, indicates a slightly greater chance of near to above normal temperatures across central Indiana. At Indianapolis, the average temperature for the summer season is 73.9 degrees. The outlook also calls for an equal chance of near, above or below normal precipitation. The average precipitation at Indianapolis is 11.93”.

Data prepared by the NWS Indianapolis Climate Team

Questions should be referred to w-ind.webmaster@noaa.gov